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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,449	05/02/2005	Atsushi Kaneda	123699	1816

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EXAMINER	
GUGLIOTTA, NICOLE T	
ART UNIT	**PAPER NUMBER**
1783	

NOTIFICATION DATE	DELIVERY MODE
06/23/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/533,449	KANEDA ET AL.	
	Examiner	Art Unit	
	NICOLE T. GUGLIOTTA	1783	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1 March 2010 and 30 April 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,6,8,24 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4, 6, 8, 24 & 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 4, 6, 8, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara et al. (EP 1251247 A1, provided by Applicants), as evidenced by Shaffer (U.S. Patent No. 4,904,625), in view of Hamanaka et al. (WO 2002/074417).

Note: US 2003/0140608 is the national stage application for WO 2002/074417, and has been cited below as the English language equivalent.

In regard to claims 1, 4, 24 & 25, Ishihara et al. disclose a porous diesel exhaust filter molded into the form of a honeycomb, wherein the porosity of the cells walls is 55% and the porosity of the plugs are 70% (Table 1, Samples 7 - 9 and 13- 15). Ishihara et al. disclose the plugs and walls were made of the same porous material (¶ [0035]). Shaffer teaches the lower density (i.e. higher porosity) of a ceramic material contributes to a lower Young's Modulus and a higher thermal shock resistance (Col. 3, Lines 46 – 48). Therefore, it stands to reason when the porosity of the plugging material is higher than that of the cell walls; the Young's Modulus of the plugging material is lower than that of the cell walls, such as in the honeycomb disclosed by Ishihara et al.

Ishihara et al. is silent in regard to the presence of silicon carbide in their honeycomb structure and the thickness of the cell walls. However, Hamanaka et al. disclose plugged (¶ [0027]) ceramic honeycombs are preferably made of silicon carbide, or silicon carbide and metallic silicon, because these materials are superior in heat resistance and thermal conduction (¶ [0031]). In regard to the plugging material, Hamanaka et al. disclose the dried honeycomb member is comprised of the extruded honeycomb member and the plugging material (¶ [0066]), and the ceramics are made of preferably metallic silicon and silicon carbide ([0032]). Therefore, it would be reasonable to believe the cells walls and the plugging material were both made of the same metallic silicon and silicon carbide composition. In addition, Hamanaka et al. teach the cell walls have thickness of 0.3 mm (300 μm)(¶ [0065]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute silicon carbide, or silicon carbide and metallic silicon, as the materials of choice in a honeycomb used as a diesel exhaust filter because of its superior heat resistance and thermal conduction, as taught by Hamanaka et al.

In regard to claim 6, Ishihara et al. disclose the honeycomb structure to be made from a ceramic material (¶ [0028]), with cells walls of 55% porosity (¶ [0031]).

In regard to claim 8, Ishihara et al. disclose the cordierite material is placed at the end of selected cells so as to form the plugs. The plugs were arranged in checker work pattern (¶ [0029]). In addition, Hamanaka et al. disclose plugged cells (¶ [0027]).

2. Claims 1, 4, 6, 8, 24 & 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichikawa et al. (U.S. Patent No. 5,595,581), as evidenced by Shaffer (U.S. Patent No. 4,904,625), in view of Hamanaka et al. (WO 2002/074417).

Note: US 2003/0140608 is the national stage application for WO 2002/074417, and has been cited below as the English language equivalent.

In regard to claims 1, 24 & 25, Ichikawa et al. disclose a honeycomb exhaust filter in which the porosity of the sealing members (corresponds to Applicants' "plugging material") of the exhaust gas filters is desired to be 110 – 140% of the porosity of the above honeycomb structure (corresponds to Applicants' "cell wall"), for maintaining a high collection efficiency and decreasing pressure losses (Col. 2, Lines 31 – 36). Shaffer teaches the lower density (i.e. higher porosity) of a ceramic material contributes to a lower Young's Modulus and a higher thermal shock resistance (Col. 3, Lines 46 – 48). Therefore, it stands to reason when the porosity of the plugging material is higher than that of the cell walls; the Young's Modulus of the plugging material is lower than that of the cell walls, such as in the honeycomb disclosed by Ishikawa et al.

Ishikawa et al. disclose the sealer of the sealing members of ceramic fibers, cordierite particles, LAS (lithium aluminosilicate) may be employed (Col. 6, Lines 21 - 24). Ishikawa et al. is silent in regard to the use of silicon carbide in the sealing members or ceramic members.

However, Hamanaka et al. disclose plugged (¶ [0027]) ceramic honeycombs are preferably made of silicon carbide, or silicon carbide and metallic silicon because these materials are superior in heat resistance and thermal conduction (¶ [0031]). In regard to

the plugging material, Hamanaka et al. disclose the dried honeycomb member is comprised of the extruded honeycomb member and the plugging material (¶ [0066]), and the ceramics are made of preferably metallic silicon and silicon carbide (¶ [0032]). Therefore, it would be reasonable to believe the cells walls and the plugging material were both made of the same metallic silicon and silicon carbide composition. In addition, Hamanaka et al. teach the cell walls have thickness of 0.3 mm (300 μm)(¶ [0065]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute silicon carbide and metallic silicon as the material of choice in a honeycomb used as a diesel exhaust filter because of its superior heat resistance and thermal conduction, as taught by Hamanaka et al.

In regard to claims 4 and 6, Ichikawa et al. disclose a porous cylindrical honeycomb structure with 45% porosity. Examiner places the burden upon the Applicant to demonstrate there is a patentable difference between 45% and 46% porosity for the cell walls.

In regard to claim 8, Ichikawa et al. disclose cells that are plugged in an alternating manner so as to form checkerboard patterns at the end faces (Figures 1 - 3). In addition, Hamanaka et al. disclose plugged cells (¶ [0027]).

3. Claims 1, 4, 6, 8, 24 & 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hijikata (WO 2002/081880), as evidenced by Shaffer (U.S. Patent No. 4,904,625), in view of Ichikawa et al. (U.S. Patent No. 5,595,581).

Note: US 2004/0101654 A1 is the national stage application for WO 2002/081880, and has been cited below as the English language equivalent.

In regard to claims 1, 24 and 25, Hijikata discloses a honeycomb assembly made of silicon carbide powder. The cell wall thicknesses are 0.38 mm (380 μm) (inside) and 0.25 mm (250 μm)(outside) (Example 1). Hijikata further teaches same material used for the honeycomb segments should be used for the plugging material (Col. 8, Lines 13 - 15). Hijikata is silent in regard to the Young's modulus and porosity of the plugging material relative to the cell walls.

Ichikawa et al. disclose a honeycomb exhaust filter in which the porosity of the sealing members (corresponds to Applicants' "plugging material") of the exhaust gas filters is desired to be 110 – 140% of the porosity of the above honeycomb structure (corresponds to Applicants' "cell wall"), for maintaining a high collection efficiency and decreasing pressure losses (Col. 2, Lines 31 – 36). Shaffer teaches the lower density (i.e. higher porosity) of a ceramic material contributes to a lower Young's Modulus and a higher thermal shock resistance (Col. 3, Lines 46 – 48). Therefore, it stands to reason when the porosity of the plugging material is higher than that of the cell walls; the Young's Modulus of the plugging material is lower than that of the cell walls, such as in the honeycomb disclosed by Ishikawa et al. It would have been obvious to one of ordinary skill in the art at the time of the invention to adjust in the honeycomb disclosed by Hijikata the porosity of the plugging material to be 110 - 140% of the porosity of the cell walls (honeycomb structure) in order to maintain high collection efficiency and decrease pressure losses.

In regard to claims 4 and 6, Ichikawa et al. disclose a porous cylindrical honeycomb structure with 45% porosity. Examiner places the burden upon the Applicant to demonstrate there is a patentable difference between 45% and 46% porosity for the cell walls.

In regard to claim 8, Hijikata discloses the ends of the cells were alternately plugged, such that each end face looked like a checkerboard pattern (Col. 8, Lines 56 - 59).

Response to Arguments

4. Applicants argues, “Applicants respectfully submit that the Young’s Modulus of a material is not necessarily a function of the porosity of the material. In fact, other factors, such as particle size and auxiliary agents, affect the Young’s Modulus. As such, an ordinarily skilled artisan would have recognized that the higher porosity of the plugs in Ishihara does not necessarily result in a lower Young’s Modulus of the plugs, as compared to the cell walls" (Remarks dated March 1, 2010, pg 2).

EXAMINER’S RESPONSE: Applicant's arguments have been fully considered but they are not persuasive. The teachings of Shaffer et al. clearly disclose the higher porosity results in a lower Young's modulus. Therefore, all other factors being equal, as taught by the references cited, when the porosity of the plugging material is lower than the cell walls, the Young’s modulus of the plugging material will be higher than the cell wall.

5. Applicants argue, "Additionally, contrary to the Office Action's assertion above, Shaffer discloses that the Young's Modulus increases as porosity increases. See Appendix (demonstrating that an increase in Percent Theoretical Density results in an increase in Young's Modulus in the samples tested in Shaffer). Thus, an ordinarily skilled artisan would not have modified the honeycomb structure of Ishihara in view of Shaffer to achieve the claimed honeycomb" (Remarks dated March 1, 2010, pg 2).

EXAMINER'S RESPONSE: Applicants' arguments have been fully considered but they are not persuasive. Applicants have confused Percent Theoretical Density as being proportional to the porosity. Indeed, they are inversely proportional. The more porous the material (greater porosity), the less dense it is (lower theoretical density). Therefore, as previously stated, the samples disclosed by Table B of Shaffer et al. (Applicants' Appendix) teach an inversely proportional relationship between porosity and the Young's modulus of a material because there is a directly proportional relationship between the percent theoretical density and the Young's modulus.

6. Applicants argue, "Hamanaka fails to cure the deficiencies of Ishihara and Shaffer because Hamanaka does not disclose a plugging material having a Young's Modulus that is lower and a porosity that is higher with respect to the cell wall" (Remarks dated March 1, 2010, pg 3).

EXAMINER'S RESPONSE: Applicants' arguments have been fully considered but they are not persuasive. The Examiner directs Applicants to the discussion above.

7. Applicants argue, "Because the filler of Hamanaka is used to bond a plurality of honeycomb cells, rather than fill the honeycomb cells, an ordinary artisan would not have had any reason or rationale to modify Ishihara's honeycomb structure using Hamanaka's bonding fillers to achieve the claimed honeycomb structure" (Remarks dated March 1, 2010, pg 3).

EXAMINER'S RESPONSE: Applicants' arguments have been fully considered but they are not persuasive. Applicant has clearly misinterpreted the rejection above. The Examiner has modified the teachings of Ishihara with Hamanaka's teachings of the plugging material, not the fillers. Therefore, any discussion towards Hamanaka's fillers is irrelevant to the rejection as it is presented above.

8. Applicants argue, "Furthermore, the June 3, 2009 Office Action, at page 10, has considered and found persuasive our arguments with respect to Hamanaka in our November 28, 2008 Amendment...Thus, the June 3, 2009 Office Action has already recognized that Hamanaka would not have rendered obvious claim 1" (Remarks dated March 1, 2010).

EXAMINER'S RESPONSE: Applicants' arguments have been fully considered but they are not persuasive. The rejection of Hamanaka was previously made over the filler material taught. Applicants' previous arguments regarding this rejection were persuasive. However, the use of Hamanaka as a secondary reference (as used above for the present rejection) regarding their plugging material is a separate issue. Hamanaka is presently cited for their teachings of the plugging material, not the filler

material. Therefore, any discussion of the filler material (and any previous rejections regarding the filler material) is irrelevant to the present rejection.

9. Applicants argue, "Ichikawa does not cure the deficiencies of Shaffer and Hamanaka with respect to claim 1" (Remarks dated March 1, 2010, pg 4).

10. Applicants argue, “Ichikawa does not cure the deficiencies of Ichikawa and Shaffer with respect to claim 1" (Remarks dated March 1, 2010, pg 5).

EXAMINER’S RESPONSE: Applicants’ arguments have been fully considered but they are not persuasive. The Examiner directs Applicants to the discussion above.

11. Applicants argue, “As discussed on page 2 of the Request, the Young’s Modulus of a material is not necessarily a function of the porosity of the material. During the interview, Examiner Gugliotta asserted that the specification appears to keep the particle size and auxiliary agent variables constant and changes only the porosity of the plugging material Examiner Gugliotta referenced page 9, lines 13 - 27, of the specification in the support of this assertion. Examiner Gugliotta further asserted that because porosity is the only variable, and all other variables remain constant, a higher porosity would necessarily lead to a lower Young’s Modulus in the plugging material" (Remarks dated April 30, 2010, Pg 2).

12. Applicants argue, “Additionally, Tables 1 and 2 in the Examples section of the specification further show that the porosity of the plugging material was not the only variable in the experiments. For example, plugging materials A, B, C and D have

varying SiC powder average particle diameters and pore forming agent amounts. See Table 2. Each plugging material A, B, C and D exhibited different Young's Modulus values" (Remarks dated April 30, 2010, Pg 3).

EXAMINER'S RESPONSE: Applicant's arguments have been fully considered but they are not persuasive. The Examiner notes the assertion made during the interview regarding the Applicant's specification was a side comment, in addition to the factual reference of Shaffer et al. cited by the Examiner in the previous office action. The Examiner directs Applicant to the discussion above regarding the reference of Shaffer et al.

First, despite Applicant's assertion that other factors, besides porosity, result in a different Young's Modulus, the Examiner notes these other factors are not limitations of the claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). See MPEP 2111.01. II.

Second, Applicant argues the amount of pore forming agent is an additional variable, besides porosity, that affects the Young's Modulus. However, the porosity of the material is a direct result of the amount of pore forming agent added. Therefore, one cannot reasonably argue the porosity and the amount of pore forming agent are separate variables.

Third, the Examiner notes for all the examples of Table 1 and Table 2, the porosity changes with the Young's Modulus. Therefore, one can not draw any concrete

conclusions that other factors, other than porosity, directly caused the observed difference in Young's Modulus between samples.

13. In response to Applicants' arguments (Remarks dated April 30, 2010, pgs 3 – 4) concerning the rejection over Ichikawa, Shaffer and Hamanaka, as well as the rejection over Hijikata, Shaffer, and Ichikawa, the Examiner directs Applicant to the discussion above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE T. GUGLIOTTA whose telephone number is (571)270-1552. The examiner can normally be reached on M - F 8:30 - 6 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
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